**South Dakota Agricultural Education (AFNR)**

**Academic Integration Activities**

**ACTIVITY #3**

*Fundamental Plant Science students will be able to analyze a text within cultural, geographical, and historical content to communicate the effect of such literary devices.*

1. **Ag Standard**

Fundamental Plant Science, FPS 1.1: Investigate articles about plant breeding and its impact on the world.

* Investigate the development of new techniques of plant breeding across the United States.
* Examine the history of plant breeding and how it has impacted the successfulness of plant genetics.
* Analyze the influence of plant breeding and how it affects the rest of the world.

1. **Academic Standard**

11.R.4.1 Students can analyze a text within cultural, geographical, and historical context.

• Recognize the connection between the written work and the circumstances that produced it.

1. **Background Information**

The over‐riding goal of analyzing writing is to demonstrate some new understanding of the text.

**How to Analyze Text**

1. Read or reread the text with specific questions of mind.
2. Organize basic ideas, events, and names.
3. Think through your personal reaction to the writing.
4. Identify and consider the most important ideas.
5. Return to the text to locate specific evidence and passages related to the major ideas.
6. Identify a thesis or topic sentence indicating a basic observation or assertion about the text.
7. Discuss what happens in the passage and why it is significant to the work as a whole.
8. Consider what is said – particularly the ideas that are expressed.
9. Assess how it is said, considering how word choice, the order of ideas, and sentence structure contribute to the meaning of the passage.
10. **Example in Context**

Consider these questions:

1. What thoughts/feelings does the author have regarding the article’s topic?
2. What example does the author make and why?
3. How has the history of plant breeding been significant to the plant science industry?

**Despite the poor understanding of the process, plant breeding was a popular activity. Gregor Mendel himself, the father of genetics, was a plant breeder, as were some of the leading botanists of his time. Mendel's 1865 paper (**[**http://www.MendelWeb.org/Mendel.html**](https://red001.mail.microsoftonline.com/owa/redir.aspx?C=9433164d098f4bbba834a6ceb764222a&URL=http%3a%2f%2fwww.MendelWeb.org%2fMendel.html)**) explaining how dominant and recessive alleles could produce the traits we see and could be passed to offspring was the first major insight into the science behind the art. The paper was largely ignored until 1900, when three scientists working on breeding problems rediscovered it and publicized Mendel's findings.  
  
Major advances in plant breeding followed the revelation of Mendel's discovery. Breeders brought their new understanding of genetics to the traditional techniques of self-pollinating and cross-pollinating plants.  
  
Corn breeders, particularly, tried numerous strategies to capitalize on the insights into heredity. Corn plants that had traditionally been allowed to cross-pollinate freely were artificially self-pollinated for generations and crossed to other self-pollinated lines in an effort to achieve a favorable combination of alleles. The corn we eat today is the result of decades of this strategy of self-pollination followed by cross-pollination to produce vigorous hybrid plants.**

Answer:

**Reading Standard**

1. The author views that the way plant breeding came across was not an “accident,” but and educated hypothesis. The author uses wording that is accurate and improving on today’s cross-pollination.
2. The author uses the example of corn breeders, in which they have taken the insights of self-pollination and artificially self-pollinated these types of corn. It gives an accurate description of how they look back at Mendel’s findings to generate new hybrid plants.

**Ag Standard**

1. This article talks about the major advances in plant breeding after Mendel’s discovery. It started the new understanding self and cross pollination and how breeders can use it to their advantage.
2. **Guided Practice Exercise**

Consider these questions:

1. What cultural issues are brought up in this article?
2. How is today’s plant breeding affecting our future?

**May 31, 2011—Seth Murray, a corn breeder at Texas A&M, and his team of graduate students are breeding new hybrids of blue and red corn lines and studying their antioxidant potential. Antioxidants have desirable health benefits and the research could lead to viable new corn varieties with high antioxidant content. “This research is really exciting because if we can increase antioxidants in our diet hopefully that will lead to a healthier population, a healthier planet,” says Murray.**

**Reading Standard**

1. Our culture as a whole is suffering from health risks. Seth Murray and his team would like to make a variety of corn that has more antioxidants, which has beneficial health benefits.

**Ag Standard**

1. New varieties of corn are always being bred. If plant breeders are trying to make healthier varieties, it affects how people across the nation will see the benefit of that breed. It also increases the chance of a healthier lifestyle for a person.

1. **Independent Practice Exercises**

Consider these questions:

1. Who is the intended audience?
2. What is the purpose for writing this article?
3. What does this article indicate about plant breeding and its affect on other nations?

**By 2050, the number of humans is expected to exceed 9 billion. Providing food, feed fuel and fiber for this enormous population is an ominous challenge facing humankind, without significant addition of new arable lands, challenges of changing weather patterns and decreased quantity and quality of fresh water. Plant breeders are the key to developing superior crops to meet these world needs. “There needs to be a sense of urgency around plant breeding as an important contributor to managing all kinds of global change, which is coming to us with increasing velocity,” says Donn Cummings, global breeder sourcing lead for Monsanto. “While these challenges are daunting and complex, agricultural innovation delivered with the aid of plant breeding innovation remains central to our well being.”**

Reading Standard

1. The population of humans that are not experts in plant breeding.
2. The purpose of this article is to show that plant breeders are the key to meeting the world’s needs with significant challenges including population rise and decrease in land and water usage.

**Ag Standard**

1. Without the innovations that plant breeders are expected to develop, we might see a bigger challenge with the growing population to provide food, feed, and fiber.
2. **Notes**

Students could also research for examples of plant breeding in articles that does not deal with corn. These can be found on the internet, magazines, historical documents, etc.

Another variation could be that teachers provide worksheets that have one long article instead of many different articles, as this example does.